

USDA-Forest Service	1. NUMBER	2. STATION
	FS-SRS-4851	Southern Research Station
RESEARCH WORK UNIT DESCRIPTION	3. UNIT LOCATION	
Ref: FSM 4070	Research Triangle Park, North Carolina	

4. RESEARCH WORK UNIT TITLE

Economics of Forest Protection and Management

5. PROJECT LEADER (Name and address)

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6. AREA OF RESEARCH APPLICABILITY

Regional and national economic and geographic analyses of land
and timber markets, sustainable forestry, values of forests, and
forestry programs and policies.

7. ESTIMATED DURATION

Five Years

8. MISSION

The Research Work Unit's mission will be to analyze the uses and values of forests in the South, including the function of land and resource markets, the effects of social change on forest conditions, measures of sustainable forestry, the formation of values for private and public forests, and the economic and social impacts of forest policies and programs.

9. JUSTIFICATION AND PROBLEM SELECTION

Most analyses of the nation's forest resources needs forecast an increasing role for the Southeast in supplying timber and other forest benefits. Population is increasing rapidly in the South, and demands for forest products, recreation, and amenity values are increasing as well. Private investment in timber growing will depend on the relative costs and returns from timber production versus values implicit in use of forests for amenity values. Market competition in resource use, as governed by public policies and laws, will dictate how public and private entities allocate their forest resources.

Signature	Title	Date
Recommended:		
/s/ Nancy G. Herbert	Assistant Director for Research	9/15/98
/s/ David N. Wear	Assistant to Staff Director	9/28/98
/s/ H. Fred Kaiser	Staff Director	9/28/98
Approved		
/s/ G. Samuel Foster for	Station Director	10/2/98
Concurred		
/s/ Barbara C. Weber	Deputy Chief for Research	10/20/98

Assessment of Southern Timber Markets-- Restrictions on the timber and wood products produced in other regions of the U.S. and imported from Canada have increased the demand for timber from the U.S. South. In the South, where private landowners produce nearly all timber, hardwood and softwood timber production has steadily increased over the past 40 years. As a result, the South has become the nation's most important wood-producing region and its market share continues to grow. At the same time, changes in the ownership profile of forest landowners imply changes in management objectives and timber supply. Increasing timber prices suggest an emerging scarcity of timber. A better understanding of the operation and potential future of timber markets in the South is needed to guide policy and investment decisions. Key research issues are the effects of land use on timber availability, the implications of forest landowners' decision making on timber supply, the linkages between changing wood product markets, and scaling market analysis from local to regional to national applications. Improve methods to evaluate the effects of changes in demand, product mix, and landowners on timber investment and markets in the South. (Problem 1).

Spatial Assessment of Change in the South's Forests— Increasing timber harvests coupled with other changes in human use patterns have compounding effects on southern forests. The human population of the South has recently grown at rates that surpass the national average. While this growth has long been focused in urban and coastal areas of the South, it has now spread into rural areas. Resulting changes in landowner characteristics and demands for competing uses of land promise to transform the southern landscape. Research is needed to assess the effects of changes in demographics, land ownership, land use, and other social forces on the extent, use, and structure of forests. Evaluating forest structures such as fragmentation and diversity will require spatially explicit analyses at relatively fine scales. Linking human use patterns to changes in forest conditions will help define the long run implications of growth and development on both environmental/ecological conditions such as biodiversity and water quality and on timber availability and supply from private land. This information will provide crucial input for market analysis, conservation planning, and policy making at local, state, and regional levels. Develop methods to assess the impacts of social forces on the extent, use, and structure of forests in the South. (Problem 2).

Measures of Sustainability— Sustainability provides a unifying framework for evaluating the overall effects of human uses of land and resources. It has emerged as the conceptual framework for international comparisons of forest use and condition and of assessments at various scales. Issues that need to be resolved include utility tradeoffs between current and future generations, the distributional implications of forest use, and meaningful measures of forest value. This information is needed by policy analysts at regional to international levels to design, interpret, and compare various "indicators" of the sustainability of forests and their uses. Develop methods for measuring the sustainability of forest ecosystems. (Problem 3).

Understanding values of forest goods and services on different land ownerships— Management practices on public and private forests have become issues of considerable public debate. With growth in the demand for competing goods and services provided by forests, the public has developed greater interest in understanding and influencing forest protection and management decisions. Public values will continue to shape the debate regarding existing and potential regulation of practices on forest land. Still, little is known regarding the values the public holds for various goods and services produced from forests and how those values are formed and evolve. In addition, little is known about how private landowners incorporate nontimber values in their decision making. The aggregate effects of these individual decisions ultimately determine the structure of forested landscapes and are the driving force behind the fragmentation of forests. Information regarding public values and their effects on management and forest conditions is needed by forest land managers and policy makers to formulate and implement policies in keeping with what the public wants. Improve methods to estimate how and why people value public and private forests and how nontimber values influence private forest management and forest conditions. (Problem 4).

Forest Policy— A broad range of policies, programs, and regulations are intended to influence forest resources throughout the world. They are generally designed to expand the area of forests or to provide nonmarket benefits from forests. Various regulations and programs may also have positive and negative effects on timber supply and the economic viability of forestry. Because government actions aimed at one resource may have impacts on other resource values and resource allocation over time and space, careful analysis is required to understand their full effects. Yet insufficient methods are available for accurately assessing the total efficiency and equity impacts of forest policies and programs. Information on the effects of policies, programs and regulations on private forests and forestry is needed by policy makers at local, state, national and international levels to guide the development of effective and efficient policy instruments for providing various forest benefits. Improve methods for evaluating forest policies and information about the costs and benefits of programs and their distribution. (Problem 5).

Many individuals and groups will be interested in these research problems and results. Individual landowners, firms and government agencies are interested in the assessment of southern timber markets (Problem 1). Better knowledge about how timber markets are changing can help (1) landowners make better choices regarding how to manage their land and forests, (2) firms develop better strategies for investment, and (3) public agencies identify potential resource scarcity and ecological changes and therefore develop better reasoned forest policies. Better knowledge of markets can enhance the competitiveness of the region as a whole. Individuals, firms and agencies are also interested in the effects of competing demands for land on the extent and management of forests (Problem 2). Information on where land and forest use may change most rapidly will help landowners effectively allocate their forest resources, help firms better understand timber availability, and help state and local governments identify where various forest services may become increasingly scarce. Insights into how and where forest cover is becoming more fragmented – a critical factor in determining the “ecological effectiveness” of forests -- will also help design and target policies to address these ecosystem services.

Well reasoned measures of sustainability are needed by government and private firms to evaluate the long-term implications of forest management and development in the South and other regions and countries (Problem 3). Better measures could be used to provide information as mandated by international agreements on sustainable forestry. These measures should also be useful for certifying the sustainability of forestry operations by individual firms or the private sector as a whole.

A better understanding of the public values of various forest goods and services and how they are formed should prove useful to conservation groups, private landowners, firms, and government agencies (Problem 4). Both nonindustrial and industrial private landowners need information on the public's perceptions of their management to better design management strategies. Because these values may motivate political action, knowledge of the representativeness of values and their intensity could help guide policy formulation. Understanding changes in values could help firms anticipate changes in timber availability and therefore make better strategic decisions. Applied to public lands, this information could help planners provide the "best" mix of goods and services from public forests.

Better assessments of the effectiveness of forest policy should help government design more effective policies in the future (Problem 5). As the relative value of all forest goods and services increases, the need for effective and specifically targeted policy expands. Understanding the distributive effects of forest policy – with regard to race, income class, and geography – will help governments enhance the fairness of policies as well.

10. APPROACH TO PROBLEM SOLUTION

Problem 1 – Assessment of Southern Timber Markets.

Research in this problem area will address the operation of timber markets in the South at various scales. As the region expands its presence as the "wood basket" of the United States, the scarcity of timber and the value of market knowledge is increasing for both private entities and government agencies. Ultimately, the effectiveness of private and public investment and of public policy in this region will hinge on detailed understanding of market structures and operations. This understanding will be enhanced through the following studies:

1. Investigate the effects of market structure on the operation of timber markets in the South. Apply findings to better understand how markets for emerging products could affect the region's production.
2. Develop and apply methods for incorporating the effects of owner and site and forest heterogeneity on regional timber supplies. Use this information to determine where changes in timber availability are likely to occur.
3. Develop methods for the spatial assessment of timber markets in the South. Apply these methods to identify areas where timber production is or is not likely to persist or expand.

4. Improve methods for evaluating forest investment and timber harvesting in a common analytical framework. Apply these methods to assess net investment and changes in forest inventories at subregional levels.

Problem 2 – Spatial Assessment of Change in the South's Forests.

Increased timber harvesting, rapid population growth, and changing demographics have the potential to substantially alter the extent and structure of the South's forests. The effects of these factors on the South's forests will be assessed through the following studies:

1. Develop models for estimating the effects of population growth, demographic change, and land markets on the allocation of land to various uses. Apply these models to forecast how and where land use is likely to change in the future, and link these changes to effects on timber markets.
2. Link models of land use and forest management to assess the impacts of these forces on the structures of forest landscapes including fragmentation and land cover diversity.
3. Develop spatially-explicit models of forest investment and production to identify where production potential is expanding and where it is contracting in the South.

Problem 3 – Measures of Sustainability.

Increasing public concern regarding the condition of natural systems throughout the world has focused attention on the monitoring of forest ecosystems and their ability to provide goods and services in a sustainable fashion. Monitoring requires development of indices or indicators that summarize change in meaningful ways. Meaningful measures of sustainable forestry will be developed through the following studies:

1. Improve the definition of needs for monitoring sustainability through an exhaustive literature review. Use this review to refine objectives for subsequent studies.
2. Improve methods for measuring the total value of in situ forests as well as extracted forest products and incorporating these values in regional and national economic accounting.
3. Develop methods for assigning value to physical measures of forest inventory. Apply these methods to better understand changes in the ability of forests to provide utility.

Problem 4 – Understanding values of forest goods and services on different land ownerships.

Public values will continue to shape the debates regarding existing and potential rules and regulations regarding the protection and management of forest land. A better understanding of how these values are formed and evolve, what values are promoted by special interest groups, and how representative interest groups are of the larger public will help forest land managers and policy makers formulate and implement policies in keeping with what the public wants. The following studies will be conducted to improve understanding in this area:

1. Improve understanding of how forest ecosystem conditions influence the values held by the general public and by various public subgroups.
2. Develop methods for aggregating across ecosystem conditions and across members of society to define total value.
3. Improve nonmarket valuation methods for estimating total ecosystem values and for understanding how education and other factors affect these values.
4. Link public and private nontimber values to forest management decisions and timber supply implications.

Problem 5 – Forest Policy.

The effectiveness and impacts of forest policy, programs, and regulations have come under increasing scrutiny with the growing public concern over the sustainability of current forest practices. Insufficient information and analytical methods are available for assessing the efficiency and equity impacts of past and present forest policy, programs, regulations, and incentives and for predicting landowner responses to proposed policies and programs. These informational needs are paramount for the design of forest policy in the U.S., but equally important in tropical developing countries, Eastern Europe, and the former Soviet Union. Research to address these needs will be pursued through the following studies:

1. Develop better methods for assessing the economic and resource implications of forest policies and programs in the United States. Apply these methods to historical and potential future policies to evaluate their effectiveness.
2. Improve methods for evaluating forest policies in various governmental and institutional settings, such as developing tropical countries where property rights may be indeterminable and eastern Europe where private markets for resources have emerged only recently.
3. Improve methods for determining the distribution of economic impacts of various forest policies across race, subregions, and income groups.
4. Develop better information on changing objectives of nonindustrial private forest landowners and their response to policies, regulations, and programs. Use these findings to evaluate the potential effectiveness of alternative policy designs.

Environmental Considerations: This work does not involve field work, use of hazardous materials, or nor does it present other environmental problems. This work will be accomplished by collecting secondary data from available data sources, or occasionally primary data from survey instruments, and analyzing the data with quantitative and qualitative statistical methods. Thus, the work described in this Research Work Unit Description falls under one of the categories of actions that do not normally have a significant effect on the

quality of the human environment and are therefore excluded from documentation in an EIS or EA (see FSH 1909.15, Chapter 30). If environmental concerns arise regarding a particular study that arises from the research described in the RWUD, these will be evaluated within individual study plans, or by Environmental Assessments or Environmental Impact Statements prepared with and approved by cooperating District or Forest staffs.

Cooperation: The RWU will collaborate with researchers at the region's universities and with other work units at the Southern Research Station or at other Forest Service Stations in conducting this research. In particular, we will cooperate with the two other social science research work units in the Southern Station:

SRS-4802	Evaluation of Legal, Tax, and Economic Influences on Forest Resource Management
SRS-4901	Outdoor Recreation and Wilderness Assessment

We will coordinate our research efforts under problem area 5 (Forest Policy) with SRS-4802. Research that addresses forest valuation and the distributive effects on forest policies will be coordinated with SRS-4901. Other likely cooperators in the Southern Station include:

SRS-4801	Forest Inventory and Analysis
SRS-4351	Evaluation of Watershed Ecosystem Responses to Natural Management and other Human Disturbances of Southeastern Forests
SRS-4101	Ecology and Management of Southern Appalachian Hardwood Forests

Likely cooperators at other Stations include:

NE-4805	Enhancing the Performance and Competitiveness of the U.S. Hardwood Industry
NC-4804	Economics of Alternate Forest Management Choices in the North
PNW-	Social and Economic Values
RM-4851	Valuation of Wildland Resource Benefits
FPL-4851	Timber Demand and Technology Assessment Research

The RWU will cooperate with the Research Valuation and Use Research Staff in the Washington Office. The RWU also will cooperate with staff groups at both national and regional levels, representing Cooperative Forestry, Ecosystem Management Coordination, Strategic Planning and Resource Assessment, and International Programs. The RWU also will cooperate with public and private universities, forest industry, and other Federal or State agencies.

11. STAFFING AND BUDGET

As of October 1998, the RWU will be staffed with the project leader, four research foresters or economists, one ecologist, a computer assistant, and a secretary. In addition, one to three temporary positions may be employed as needed. One more permanent position may be filled if budgets are satisfactory. The scientist-years of internal staff devoted to research are classed by problem area below. Additionally, scientist-years will be contributed by academic cooperators and by temporary employees who may assist in completion of some research.

<u>Problem Number</u>	<u>Scientist-Years Per Annum</u>
1	0.9
2	1.0
3	1.2
4	0.9
5	1.0

Full implementation of this Research Work Unit Description would require a budget of approximately \$1.2 million. With current levels of funding (\$930,000) efforts would be scaled back on the distributive effects of forest policies (study area 5.3), evaluating the effects of policies in various institutional settings (5.1), linking public and private non-timber values to timber supply implications (4.4), assigning values to physical measures of forest inventory (3.3), and spatial assessment of timber markets (1.3).